

# Health Technologists and Technicians

## Cardiovascular Technologists and Technicians

(O\*NET 32925 and 32926)

### Significant Points

- Employment will grow as fast as the average, but the number of job openings created will be low, because the occupation is small.
- About 8 out of 10 jobs are in hospitals, in both inpatient and outpatient settings.

### Nature of the Work

Cardiovascular technologists and technicians assist physicians in diagnosing and treating cardiac (heart) and peripheral vascular (blood vessel) ailments.

Cardiovascular technologists specializing in cardiac catheterization procedures are called *cardiology technologists*. They assist physicians with invasive procedures in which a small tube, or catheter, is wound through a patient's blood vessel from a spot on the patient's leg into the heart. This is done to determine if a blockage exists and for other diagnostic purposes. In balloon angioplasty, a procedure used to treat blockages of blood vessels, technologists assist physicians who insert a catheter with a balloon on the end to the point of the obstruction.

Technologists prepare patients for these procedures by first positioning them on an examining table and then shaving, cleaning, and administering anesthesia to the top of the patient's leg near the groin. During the procedures, they monitor patients' blood pressure and heart rate using electrocardiogram (EKG) equipment and notify the physician, if something appears wrong. Technologists may also prepare and monitor patients during open-heart surgery and the implantation of pacemakers.

Cardiovascular technologists and technicians may specialize in noninvasive peripheral vascular tests. Those who assist physicians in the diagnosis of disorders affecting circulation are known as *vascular technologists*. Vascular technologists use ultrasound instrumentation, such as doppler ultrasound, to noninvasively record vascular information, such as blood pressure, limb volume changes, oxygen saturation, cerebral circulation, peripheral circulation, and abdominal circulation. Many of these tests are performed during or immediately after surgery. Technologists and technicians who use ultrasound on the heart are referred to as *echocardiographers*. They use ultrasound equipment that transmits sound waves and then collects the echoes to form an image on a screen.

Cardiovascular technicians who obtain electrocardiograms are known as *electrocardiograph* (abbreviated *EKG* or *ECG*) *technicians*. To take a basic EKG, which traces electrical impulses transmitted by the heart, technicians attach electrodes to the patient's chest, arms, and legs, and then manipulate switches on an electrocardiograph machine to obtain a reading. This test is done before most kinds of surgery and as part of a routine physical examination, especially for persons who have reached middle age or have a history of cardiovascular problems.

EKG technicians with advanced training perform Holter monitor and stress testing. For a Holter monitoring, technicians place electrodes on the patient's chest and attach a portable EKG monitor to the patient's belt. Following 24 to 48 hours of normal routine for the patient, the technician removes a cassette tape from the monitor and places it in a scanner. After checking the quality

of the recorded impulses on an electronic screen, the technician prints the information from the tape, so a physician can interpret it later. The printed output from the scanner is eventually used by a physician to diagnose heart ailments.

For a treadmill stress test, EKG technicians document the patient's medical history, explain the procedure, connect the patient to an EKG monitor, and obtain a baseline reading and resting blood pressure. Next, they monitor the heart's performance, while the patient is walking on a treadmill, gradually increasing the treadmill's speed to observe the effect of increased exertion. Those cardiovascular technicians who perform EKG and stress tests are known as "noninvasive" technicians, because the techniques they use do not require the insertion of probes or other instruments into the patient's body.

Some cardiovascular technologists and technicians schedule appointments, type doctor interpretations, maintain patient files, and care for equipment.

### Working Conditions

Technologists and technicians generally work a 5-day, 40-hour week that may include weekends. Those in catheterization labs tend to work longer hours and may work evenings. They may also be on call during the night and on weekends.



Cardiovascular technologists and technicians use computers to monitor cardiac procedures.

Cardiovascular technologists and technicians spend a lot of time walking and standing. Those who work in catheterization labs may face stressful working conditions, because they are in close contact with patients who have serious heart ailments. Some patients, for example, may encounter complications from time to time that have life or death implications.

### Employment

Cardiovascular technologists and technicians held about 33,000 jobs in 1998. Most worked in hospital cardiology departments, whereas some worked in cardiologists' offices, cardiac rehabilitation centers, or ambulatory surgery centers. About one-third were EKG technicians.

### Training, Other Qualifications, and Advancement

Although some cardiovascular technologists, vascular technologists, and echocardiographers are currently trained on the job, an increasing number receive training in 2- to 4-year programs. Cardiology technologists normally complete a 2-year junior or community college program. One year is dedicated to core courses followed by a year of specialized instruction in either invasive, noninvasive, or noninvasive peripheral cardiology. Those who are qualified in a related allied health profession only need to complete the year of specialized instruction. Graduates from programs accredited by the Joint Review Committee on Education in Cardiovascular Technology are eligible to register as professional technologists with the American Registry of Diagnostic Medical Sonographers or Cardiovascular Credentialing International.

For basic EKGs, Holter monitoring, and stress testing, 1-year certificate programs exist; but most EKG technicians are still trained on the job by an EKG supervisor or a cardiologist. On-the-job training usually lasts about 8 to 16 weeks. Most employers prefer to train people already in the health care field—nursing aides, for example. Some EKG technicians are students enrolled in 2-year programs to become technologists, working part-time to gain experience and make contact with employers.

Cardiovascular technologists and technicians must be reliable, have mechanical aptitude, and be able to follow detailed instructions. A pleasant, relaxed manner for putting patients at ease is an asset.

### Job Outlook

Employment of cardiovascular technologists and technicians is expected to grow as fast as the average for all occupations through the year 2008, with technologists and technicians experiencing different patterns of employment change.

Employment of *cardiology technologists* is expected to grow much faster than the average for all occupations. Growth will occur as the population ages, because older people have a higher incidence of heart problems. Likewise, employment of vascular technologists will grow faster than the average, as advances in vascular technology reduce the need for more costly and invasive procedures.

In contrast, employment of *EKG technicians* is expected to decline, as hospitals train nursing aides and others to perform basic EKG procedures. Individuals trained in Holter monitoring and stress testing are expected to have more favorable job prospects than those who can only perform a basic EKG.

Some job openings for cardiovascular technologists and technicians will arise from replacement needs, as individuals transfer to other jobs or leave the labor force. Relatively few job openings, due to both growth and replacement needs are expected, however, because the occupation is small.

### Earnings

Median annual earnings of cardiology technologists were \$35,770 in 1998. The middle 50 percent earned between \$29,060 and \$42,350 a year. The lowest 10 percent earned less than \$23,010 and the

highest 10 percent earned more than \$49,780 a year. Median annual earnings of cardiology technologists in 1997 were \$34,500 in hospitals.

Median annual earnings of EKG technicians were \$24,360 in 1998. The middle 50 percent earned between \$19,660 and \$30,860 a year. The lowest 10 percent earned less than \$16,130 and the highest 10 percent earned more than \$39,060 a year. Median annual earnings of EKG technicians in 1997 were \$23,200 in hospitals.

### Related Occupations

Cardiovascular technologists and technicians operate sophisticated equipment that helps physicians and other health practitioners diagnose and treat patients. So do nuclear medicine technologists, radiologic technologists, diagnostic medical sonographers, electroneurodiagnostic technologists, perfusionists, radiation therapists, and respiratory therapists.

### Sources of Additional Information

For general information about a career in cardiovascular technology contact:

✦ Alliance of Cardiovascular Professionals, 910 Charles St., Fredericksburg, VA 22401.

For a list of accredited programs in cardiovascular technology, contact:

✦ Joint Review Committee on Education in Cardiovascular Technology, 3525 Ellicott Mills Dr., Suite N, Ellicott City, MD 21043-4547.

For information on vascular technology, contact:

✦ The Society of Vascular Technology, 4601 Presidents Dr., Suite 260, Lanham, MD 20706-4365.

For information on echocardiography, contact:

✦ American Society of Echocardiography, 4101 Lake Boone Trail, Suite 201, Raleigh, NC 27607.

For information regarding registration and certification contact:

✦ Cardiovascular Credentialing International, 4456 Corporation Lane, Suite 110, Virginia Beach, VA 23462.

✦ American Registry of Diagnostic Medical Sonographers, 600 Jefferson Plaza, Suite 360, Rockville, MD 20852-1150.

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## Clinical Laboratory Technologists and Technicians

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(O\*NET 32902, 32905, and 66099D)

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### Significant Points

- Medical and clinical laboratory technologists usually have a bachelor's degree with a major in medical technology or in one of the life sciences; medical and clinical laboratory technicians need either an associate's degree or a certificate.
- Competition for jobs has increased, and individuals may now have to spend more time seeking employment than in the past.

### Nature of the Work

Clinical laboratory testing plays a crucial role in the detection, diagnosis, and treatment of disease. Clinical laboratory technologists and technicians, also known as medical technologists and technicians, perform most of these tests.

Clinical laboratory personnel examine and analyze body fluids, tissues, and cells. They look for bacteria, parasites, and other microorganisms; analyze the chemical content of fluids; match blood for transfusions, and test for drug levels in the blood to show how a patient is responding to treatment. These technologists also prepare specimens for examination, count cells, and look for abnormal